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EVIDENCE BASED POLICY MAKING IN CLIMATE CHANGE MITIGATION

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Abstract
The paper reviews the challenges of using evidence-based policy-making in climate change mitigation. It is specifically concerned with the study of the interaction between the scientific field and the conception and implementation of climate change policies. This interaction is very important in determining the best ways to deal with this phenomenon with adverse implications for society.

Key words: *climate change, climate denial, evidence, mitigation, policy-making,*

JEL Classification: *Q01; Q5; Q50; Q54; Q58*

I. INTRODUCTION

Long-term changes of local, regional and global climate conditions - commonly known as climate change - is widely considered in the scientific environment to be one of the largest and most complex challenges for humanity, which will produce more and more problems and economic adversity in society. Due to its globally distributed nature, climate change can only be mitigated through interventions of global relevance. Currently, these interventions are mostly policy-type measures of greenhouse gases (GHG) emissions reductions at the impulse of international agreements such as the Kyoto Protocol[3] (KP) or Paris Agreement[4] (PA). However, the fate of these international accords, and by extension of climate change mitigation efforts, rests on nationally determined policies and implementation. It is therefore particularly relevant to study the interaction and dynamics between science and policy-making with relation to climate change.

Increasingly in the modern age, political decisions are based on solid science, based on research and studies. In general, any legislative act is grounded on preliminary impact assessments. Complex legislative projects are based on concrete data, research and evidence of scientific value, carried out by research institutes, universities, companies or non-governmental organizations.

In the case of climate change the most authoritative inputs come from the Intergovernmental Panel on Climate Change (IPCC), which is the international body informing decision-makers on the scientific data and research related to climate change. The IPCC was stablished by the United Nations Environment Program (UNEP) and the World Meteorological Organization (WMO) in 1988, with the objective of providing a clear scientific outlook on climate change and its socio-economic effects and on the environment.

To date, the IPCC has published five comprehensive assessment reports and a very wide range of complementary reports and data that underpin actions and policies to mitigate and adapt to climate change. The latest IPCC assessment report (IPCC, 2014), published in four parts from September until November 2014, states that "human influence on the climate system is clear and that recent greenhouse gas emissions of anthropogenic nature are the highest in history" and that "recent climate change has had a widespread impact on human and natural systems".

The Paris Agreement, which is the latest international attempt to codify global efforts for climate change mitigation no longer relies on binding emission reduction targets for the Parties but on voluntary, so-called Nationally Determined Contributions (NDCs). While this switch was important to underline the universality of the problem and the corresponding need for inclusive participation it created a new level of decision-making in the governance model of climate change. Accordingly, the process is now more heterogeneous and prone to subjective influences, and calls more than ever for evidence-based policy-making at national level to ensure consistency with the aims of this critical agreement.

Evidence-based policy-making is currently used widely, almost becoming a norm, but a systematic approach of this kind has only been imposed relatively recently. For a long time, the main determinant for political decisions were ideologies, namely systems of ideas and concepts related in particular to society and the economy, which underpin the doctrinal and governmental programs of political parties.

[3] Adopted in 1997 under the United Nations Framework Convention on Climate Change (UNFCCC); Kyoto Protocol commits its Parties to internationally binding emission reduction targets

[4] Adopted in 2015 under UNFCC; the Paris Agreement aims at keeping the rise of global temperature below 2 degrees Celsius above pre-Industrial levels mainly through Nationally Determined Contributions (NDCs) of GHG emission reductions

II. THE RISE OF EVIDENCE-MAKING POLICY-MAKING

The establishment of a new type of policy formulation that goes beyond ideology and proves the functionality of policies through scientific evidence is credited by Davies et al. (2000) and Parsons (2002) to the UK Labour Government in 1997, which was elected mainly on account of political concepts like "*what matters is what works"*. Moreover, the government described later through a White Paper on the modernization of governance (UK Prime Minister, 1999) the ways in which policy development and implementation must take account of evidence: policies must be future-oriented and modelled by evidence rather than short-time pressures, and the government needs to improve the use of evidence and research in order to better understand the issues that are being addressed.

While exploring the concept through a comprehensive reflection paper, the Australian government (AGPC, 2009) defined evidence-based policy-making as *a process that uses transparent and rigorous evidence in designing, implementing, and refining a policy to meet its objectives.* The evidence used in policy-making must meet several criteria: to be *comprehensive, tested, rigorous and, ideally, reproducible*, to be *robust and avoid methodological pitfalls*, and the whole process to be *transparent and open to critic*.

However, evidences do not have a uniform and equally prescriptive nature, because they often differ significantly by the research methods through which they were obtained. That is why it became necessary to systematically differentiate and prioritise among different types of evidences. Researchers in the field have proposed a hierarchical classification of evidences, in an order based on the quality of research, assessed by precise methodological principles and criteria. These *hierarchies of evidences* have been inspired by medical research and the hierarchical categories of proofs used in medical practice. In fact, the use of evidences in medicine in order to establish best practices or determine the safety or effectiveness of a new treatment is at the heart of the current evidence-based policy-making process.

Leigh (2009) exemplifies this notion with the use of evidence hierarchy by the US government in medical research or by the British Government in the social field, which gives maximum priority to systematic evaluations (or meta-analyses - syntheses of results from multiple studies).

Leigh proposes six distinct levels of evidence categories that are useful in developing social policies (education, health, crime prevention, or social welfare):

1. Systematic reviews (meta-analyses) of multiple randomized studies;
2. High quality randomized studies;
3. Systematic evaluations (meta-analyses) of natural experiments or controlled trials "before and after" without random testing;
4. Natural experiments (quasi-experiments), using techniques such as differences-in-differences, regression discontinuity, matching or multiple regression;
5. Before-after (pre-post) studies;
6. Theoretical conjectures and opinions of experts.

Leigh argues that for areas such as defence policy or monetary policy, it might be more appropriate a different type of hierarchy.

The reason why this evidence hierarchy, which emphasizes systematic evaluations combined with random testing, is widely accepted by decision-making bodies is because it seeks to establish objective grounds and criteria for political decisions as opposed to arbitrariness or subjective influences. In general, the order of classification in such hierarchies is given by the credibility of the results obtained under an intervention as compared to the status of the system or the tested group in the absence of that intervention.

Evidence hierarchies have the advantage of providing policymakers with a precise methodological tool to discern the most relevant evidence and data, according to established objectives, from the multitude of existing studies and research.

The general meaning of policy-making based on evidence - and implicitly on hierarchies of evidence - is that of *rational* approaches in opposition to *empirical*, subjective, belief-based and conventional judgments, which may often be wrong.

III. CLIMATE CHANGE AND THE EVIDENCE BASED POLICY-MAKING

With all the growing influence of scientific evidences, their acceptability in decision-making processes is still variable and subject to arbitrary political options and ideologies. From this perspective, there is no more controversial and complex use of evidence than in climate change policies.

As evidence has accumulated in the scientific community about the reality of climate change and its impact on society, the political action to deny the phenomenon has increased. Dunlap and McCright (2011) describe how interested groups such as oil companies and energy-intensive industries whose field of activity tends to be restricted by the reduction in the use of fossil-fuels or American conservative think-tanks have stepped up and gradually organized the denial of climate change evidence at the level of the United States administration (one of the most important GHG emitters) and globally. This action has led to significant influences in the development and implementation of public policies related to climate change mitigation and adaptation.

One of the reasons for Kyoto Protocol's limited achievements was the non-ratification of the Protocol by the United States. The Kyoto agreement covered only 18% of the total global GHG emissions[5] without the US and therefore did not produce a relevant impact on cutting world's emissions. The United States non-ratification also meant that the KP's market mechanisms based on trading emission allowances did not have enough volume to create a genuinely global carbon market. US's withdrawal from the KP could be attributed in part to an increasingly partisan divide between Republican and Democrat decision-makers on climate change.

This divide was based partially on economic rationales citing the need for a level playing field in cutting emissions with emerging economic competitors like China. A bipartisan resolution (Hagel-Byrd, 105th Congress, 1997) adopted by the US Senate just a few months before the adoption the KP – requested that the US should not be a signatory of new commitments to limit or reduce GHG emissions for developed countries (so called Annex I Parties) unless there are scheduled commitments to limit or reduce GHG emissions for Developing countries in the same compliance period.

But the partisan divide that led to US's rejection of the KP was also largely attributed to climate change denial orchestrated by conservative groups in opposition to scientific evidence. Dunlap and McCright (2003) argue that a major reason the United States failed to ratify the Protocol was the opposition of the American conservative movement, which mobilized between 1990 and 1997 to challenge the notion of global warming. More recently, the US Administration announced the intention to also withdraw from the Paris Agreement, a measure which again could be attributed partly on economic and competitiveness considerations and partly to ideological climate denial.

Nowadays, the most important type of climate denial is the anthropogenic nature of climate change. Whereas global warming is generally no longer contested, it is denied that it is provoked and accelerated by anthropogenic activity and the increase of GHG emissions since the industrial revolution. The political implications are obvious: if climate change is not caused by humans but for example by increasing solar activity or natural cycles, then it is not possible to mitigate the phenomenon through emissions reduction policies either.

But even for policy-makers who accept the reality and scale of anthropogenic climate change, choosing the right policies is very difficult because of the immense complexity and the peculiarities of the phenomenon.

Climate change has a very long cycle, with incremental evolution and effects that cannot be perceived, studied and understood but over several generations during decades or even hundreds of years. The sources of GHG emissions are multiple, and their interactions with the environment are very complex and still underdeveloped. For example, until recently, tropical forests are considered to be carbon neutral or even absorbent. Baccini et al. (2017), however, determined on the basis of satellite measurements that tropical forests are rather a net source of emissions as a result of deforestation and degradation of carbon storage capacity. However, the methodology used by Baccini et al. is challenged by other researchers who urge caution in using satellite data that can be compromised by atmospheric interference and cannot accurately detect the growth rate of forests (Hansen, M. quoted by Popkin, G., 2017). This example illustrates the difficulty of developing evidence-based policies in the field of climate change, given that scientific evidence in this area cannot yet have high levels of certainty.

In contrast to climate cycles, economic and technological cycles have a medium-term to shorter periodicity, and political cycles are usually short and very short. Consequently, it is difficult to synchronize goals and methodologies with so different time perspectives.

Alesina and Roubini (1992) divide the motivations of political decision-makers in electoral cycles into two categories: opportunist - where policies are chosen to please voters in order to maximize chances of re-election, or partisan - where decision-makers represent specific interests, often mono -dimensional groups of political supporters. Each of these models of political cycles is difficult to synchronize with the current cycle of climate change - which either takes too long to be considered by the opportunist model, or is too complex to be effectively addressed by partisan models.

[5] EU Commission, *Progress made in cutting emissions: Kyoto 1st commitment period (2008–12)*, retrieved from https://ec.europa.eu/clima/policies/strategies/progress/kyoto_1_en

Moreover, unlike conventional environmental issues such as air pollution or harmful chemical contamination, which are localized and therefore relatively easy to fit in terms of resolution policies and instruments, climate change is a phenomenon with a global impact, which requires a global aggregated response to be managed effectively. However, the determinant motivations of political actors are localized regionally and dependent on local electoral constituencies. This issue comes many times in opposition with the need to treat climate as a global common good to which everybody can contribute and that could affect everybody.

IV. CONCLUSION

The study reveals several types of challenges to employing evidence-based policy-making in climate change mitigation, which continue to hamper the efficiency of international agreements in the field.

The first such challenge arises from a general, ideological or skeptical opposition to science and scientific research methodology. The most representative is denial of climate change or anthropogenic climate change. This type of challenge was and continues to be damaging to global efforts to reduce the impact of climate change.

The second one is based on local and partisan approaches to climate change in contrast with the holistic and universal method needed to effectively counter this phenomenon. These types of approaches usually emphasize much more local and short-term economic considerations than the needs of the ailing environment.

The third relates to the difficulty to match the long-term cycle of climate change with the short- and medium-term political and technological cycles. This creates problems in terms of process homogeneity and consistency with long-term objectives.

Finally, a fourth challenge relates to the inherent complexity of climate change. Science by nature does not provide absolute certainties. Data and research about climate change are abundant yet the impacts, relations and feedbacks that affect climate are far from being comprehended and predicted by science with a high degree of certainty. This can and is speculated in the political environment to advance partisan approaches. Another issue is the difficulty for political makers to discern from the amplitude of studies and data available on climate change. This requires a sound methodological approach to policy-making based on an accepted hierarchy of evidence.

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